



## *EPA Region 7 TMDL Review*

TMDL ID                    214                                    Water Body ID            0686

Water Body Name    Sugar Creek

Pollutant                    pH

Tributary

State                        MO                    HUC                    10280203-040002

Basin

Submittal Date        11/26/2002

Approved                yes

### **Submittal Letter**

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

Submittal letter dated November 25, 2002 was received on November 26, 2002.

### **Water Quality Standards Attainment**

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

MO WQS 10 CSR20-7.031 Section (4)(E) says water contaminants shall not cause pH to be outside of the range of 6.5-9.0 standard units. Beneficial usage of the creek are livestock and wildlife watering along with protection of warm water aquatic life and human health associated with fish consumption.

### **Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

pH water quality standard will be met and maintained with a secondary numeric water quality total alkalinity target of 90 mg/L calcium carbonate or more year round.

#### **Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

pH criterion may not provide enough assurance that the proper pH range will be maintained due to possible latent acidity. Net alkalinity would be the preferred secondary water quality target, but the lack of sufficient acidity data makes this analysis difficult. Because of this, total alkalinity will be used as the secondary numeric water quality target. Alkalinity can be measured in Sugar Creek and can be linked to the pH criterion.

#### **Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

The major contribution to pH is acid mine discharge as a result of sulfide minerals in rocks being oxidized in water and air. Also, acid mine discharge from underground workings also affect the tributary draining the Huntsville gob pile. Acid mine discharge is diluted by Sugar Creek much of the year, but dilution is reduced during summer months, thus declining the water quality in the creek.

#### **Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

Dry weather design flow from the Sugar Creek abandoned mine land can not be accurately determined because surface flow and seepage rates from the area are variable. The creek maintains permanent flow, even during dry periods. Dry weather design is therefore 0.1 cfs or greater. Since there can be minimal upstream dilution during dry weather conditions, the flow of water coming from the Sugar Creek abandoned mine land area will have to meet in-stream water quality standards for pH (6.5-9.0 SU) and an alkalinity of 90 mg/L calcium carbonate or more. Neither the pH nor the alkalinity concentrations used as the numeric TMDL endpoints can be summed as LAs + WLAs + MOS.

#### **WLA Comment**

There are no point source dischargers therefore the WLA is zero.

#### **LA Comment**

Load capacity is concentration based; discharges to the Sugar Creek will be required to meet a 70 mg/L calcium carbonate alkalinity target.

#### **Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

MOS is an additional 20 mg/L calcium carbonate above the 70 mg/L calcium carbonate load allocation. This corresponds to a pH of 6.5 based on regression analysis.

#### **Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

No seasonal variation; the primary processes involved in the formation of acid water and the oxidation of sulfide are not significantly impacted by differences in air and water temperatures associated with seasonal change.

#### **Public Participation**

*Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

Draft copy of report was placed on public notice from October 11 to November 10, 2002. Public comments were received and appropriate adjustments/edits were made in the final report.

#### **Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

Since this is a phased TMDL, MDNR will continue low flow water chemistry monitoring of Sugar Creek during implementation and post-implementation. Monitoring is also part of the Agriculture Nonpoint Source Special Area Land Treatment (AgNPS SALT) project to assess progress and measure success. The creek will be re-evaluated after the restoration plan has been implemented. If post implementation monitoring shows that WQS are still not met for pH or alkalinity, the TMDL will be re-opened and re-evaluated.

#### **Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

Citizen's group under the AgNPS SALT agreement is charged to follow through with certain responsibilities toward improving Sugar Creek. Also, periodic review of the MDNR's water quality management plans and monitoring data by the department should provide reasonable assurance that Sugar Creek will move towards water quality standards

attainment.

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